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ABSTRACT

Faculty replacement needs for the next 15 years are projected at a multi-institutional level within the context of a simulated attrition model. Study participants are members of the Higher Education Data Sharing Consortium. The first study phase consisted of summary data from 60 institutions on mean age, standard deviation, and median age of full-time faculty by rank. The second phase involved faculty attrition ratios such as the annual rate of faculty loss for each of several reasons. Another statistic from the colleges was the anticipated annual rate of overall faculty growth over the next several years. The third phase, formulation of the faculty replacement needs model, relied on attrition ratios and on actual faculty age distributions. Results suggest that: (1) the next 15 years will see a steep increase in the annual net loss of college faculty, with replacement exacerbated by growth in the overall size of the professoriate; (2) the distribution of current age, retirement year, total retirees, total net loss, total new hires, and the summary ratios are similar because retirees account for most of the year-to-year variability in these measures though only 17-37% of total net faculty loss; (3) faculty aging, retirement, and attrition appear to have a differential impact on various academic departments; and (4) probable needs in the late 1990s and beyond may be even greater than those projected if the quality of instruction and research at American colleges and universities is to be maintained or enhanced. An appendix describes departmental clustering (humanities, sciences, social sciences, and other). Tables and charts are included. The paper contains 14 references. (SM)

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Faculty Replacement Needs for the Next 15 Years: A Simulated Attrition Model

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Introduction

The past several years have witnessed a growing concern over the possibility of a disproportionate loss of experienced faculty due to retirement over the next decade. The faculty hiring surge of the 1960's, when higher education in this country expanded to accomodate larger numbers of college-bound high school graduates, resulted in a major increase in the size of the national professoriate. As has been observed with other post-war demographic phenomena, this large group has moved through the life span together and will soon be approaching another developmental transition, retirement. While the elimination of the mandatory retirement age in 1994 may delay or extend the potential mass retirement, experience suggests that most faculty will continue to retire at or around age 65 (Lozier & Dooris, 1987; Brown et al., 1987; Calvin, 1984). A recent study of 12 research universities (Lozier & Dooris, 1989) revealed that the average retirement age for faculty over a five-year period was 65.1 years, with almost no variation (standard deviation = 0.4) across time. Another study by the Consortium on Financing Higher Education (COFHE, 1987) found a mean retirement age of 64.8 and 66.3 years at public and private institutions, respectively. Few of the 36 institutions participating in the COFHE study had systematic data on actual or projected faculty retirement trends, however.

Retirement is only one factor in the computation of faculty replacement needs. Other factors include death and disability, transfer to other institutions or professions, failure to attain tenure or non-tenure contract renewal, or dismissal for other reasons. Attempts to track faculty by academic rank must also take into account promotion of tenured faculty to higher ranks (and thus, loss from the previous rank). Although these aspects of faculty flow are everyday realities for all colleges and universities, detailed record-keeping and cross-institutional analysis appear to be the exception rather than the rule.

Given the strength of the professorial job market in recent years, most institutions have been able to fare well without specific planning information on faculty replacement needs. Two features of the future job market suggest that, in the absence of a major expansion of faculty supply in certain fields,

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many institutions may not be able to afford the luxury of such hand-to-mouth human resource planning. First, most of higher education may experience a dramatic increase in faculty need simultaneously. Under normal circumstances, a college that usually hires 10 new faculty annually should be able to recruit 15 in a peak year without great difficulty. If every other college in the country experiences a 50% growth in faculty need at the same time, however, a shortage of qualified faculty is almost inevitable. Second, faculty shortages may occur in selected academic disciplines rather than across the board (Lozier & Dooris, 1989). If they occur disproportionately in fields where supply is already low due to decreases in Ph.D. production and/or competition with non-academic employment opportunities (e.g., business administration, engineering), the viability of entire programs could be in jeopardy at some institutions. Both of these factors may be exacerbated by the projected rebound in numbers of college-bound high school graduates in the latter half of the next decade (WICHE, 1988).

Given the possibility of a faculty shortage and an accompanying decline in the actual or perceived quality of the American professoriate (Bowen & Schuster, 1986), surprisingly little institutional research has been published on this topic. While most deans and personnel officers track short-term needs on the local level, supply and demand data for the national academic labor market across a longer period of time are conspicuously absent from recent doomsday reports (e.g., Cordes, 1987; Mooney, 1989). The purpose of the present study is to project faculty replacement needs for the next 15 years at a multi-institutional level within the context of a simulated attrition model.

Method and Findings

Participants in the present study are members of the Higher Education Data Sharing Consortium; most are private Liberal Arts Colleges, as defined by the Carnegie classification system. There were three phases of data collection. The first phase consisted of summary data from 60 institutions, including the mean age, standard deviation, and median age of full-time faculty by rank (i.e., full vs. associate vs. assistant professor). Fifty-four (90%) of these institutions are Liberal Arts Colleges; they range in size from 37 to 303 (mean=122) full-time faculty.

These summary data, listed in Table 1, were collected to test the representativeness of a smaller sample of 29 institutions used in the third phase of the study, the replacement needs model. Within this latter sample, 25 (86%) are Liberal Arts Colleges; they range in size from 38 to 303 (mean=122) full-time faculty. In general, the samples resemble each other reasonably well in terms of mean faculty ages and distribution across ranks. The 29-college sample used in the replacement needs model has relatively more assistant professors and fewer full and associate professors than the 60-college sample, resulting in a slightly lower overall mean age in the smaller group. Of greater interest

to the issue of faculty retirement, however, is the similarity in mean age and standard deviation among full professors in the two samples. Since 74% of the projected retirements for the next 15 years are expected to occur among current full professors, the representativeness of the sample at this rank is especially important for establishing the validity of the replacement needs model.

Table 1

Faculty Age Summary

60 Colleges

	Full	Associate	Assistant	All Ranks
Number	2,813	2,223	2,262	7,298
% of all Faculty	38.5%	30.5%	31.0%	
Mean Age in Years	53.9	45.6	37.9	46.4
Standard Deviation	6.8	6.6	6.2	

29 Colleges (Model Sample)

	Full	Associate	Assistant	All Ranks
Number	1,310	1,024	1,207	3,541
% of all Faculty	37.0%	28.9%	34.1%	
Mean Age in Years	53.7	45.2	37.5	45.7
Standard Deviation	7.2	7.3	6.7	

NOTES: Ages have been calculated as of June 30, 1989.
Standard deviations for the 60-college sample are based on an unweighted average of each college's standard deviation for each faculty rank, since full age distributions were not available for this group.

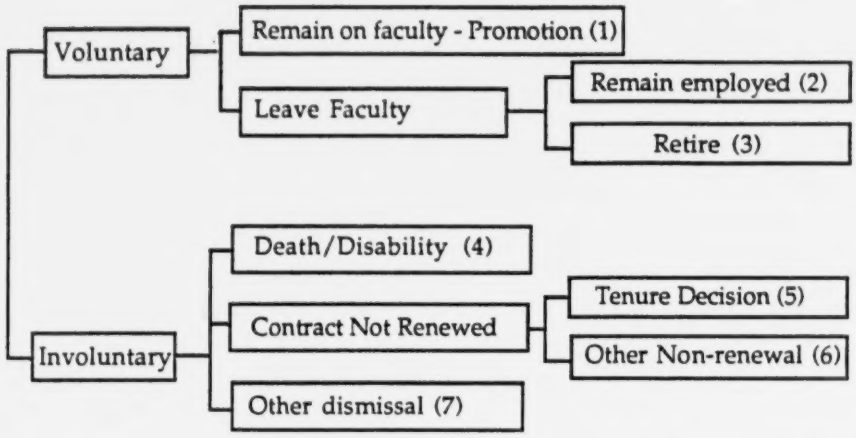
The second phase of data collection involved faculty attrition ratios, i.e., the annual rate of faculty loss from each rank for each of several reasons. These reasons, illustrated in Table 2, include various categories of voluntary and involuntary departure. An additional statistic provided by the colleges was the anticipated annual rate of overall faculty growth over the next several years. Twenty-six institutions (22, or 85%, Liberal Arts Colleges) provided and verified these data. They are listed in Table 3.

The replacement needs model was formulated with a conservative bias. Consequently, median rather than mean attrition rates were used to reduce distortion (typically, inflation) by extreme values, especially given the probable level of measurement error in the estimates obtained from some colleges. A total attrition ratio derived by summing these median values was still problematic because of

missing data and the high incidence of zero values in many categories (leading to an underestimation of attrition for dramatically skewed distributions). For this reason, the attrition index used in the

Table 2

Faculty Attrition Flow Chart



replacement needs model was the median of the institutional total attrition for each rank (Table 4). The only exception to this rule occurred for associate professors, where the mean of the institutional total attrition was used (for this rank the median appeared to provide an overestimation of true attrition). The use of institutional totals, rather than the sum of each attrition category's median value, corrected for inconsistent categorization of attrition by individual colleges (e.g., "loss of renewal" and "loss of tenure" were frequently interchanged, as were "voluntary transfer" and "other

Table 3

Average (Median) Annual Faculty Attrition Rates, 26 Colleges

Reasons	Full	Associate	Assistant	All Ranks
(1) Promotion	0.00%	7.99%	9.95%	5.80%
(2) Transfer elsewhere	0.50%	1.50%	4.81%	2.20%
(3) Retirement	3.65%	0.00%	0.00%	1.50%
(4) Death/Disability	0.60%	0.00%	0.00%	0.38%
(5) Loss of tenure	0.00%	0.00%	0.00%	0.00%
(6) Loss of renewal	0.00%	0.00%	3.00%	1.00%
(7) Other Dismissal	0.00%	0.00%	0.00%	0.00%
All Reasons	4.75%	9.49%	17.76%	10.88%

dismissal"). The effects of this approach appear to be greater consistency with other faculty attrition estimates in the literature (Bowen & Schuster, 1986), which are typically lower than those in the present study, and possibly a tendency to understate rather than exaggerate future faculty losses.

Table 4

Total Attrition Rates for Replacement Needs Model

Measure	Full	Associate	Assistant	All Ranks
Mean	1.96%	**10.49%**	21.89%	9.94%
(Std Dev)	(0.90)	(2.73)	(6.68)	(2.71)
Median	**1.54%**	11.84%	**21.53%**	9.70%

NOTE: These totals exclude retirement ratios because age-driven estimates were included in the model to account for this attrition category. They include attrition from one rank for promotion to the next rank.

The third phase of the study, formulation of the faculty replacement needs model, relied on the attrition ratios noted above as well as the actual faculty age distributions of 29 institutions. Each of the latter colleges provided the date of birth, rank, year of appointment, and academic department of full-time faculty members at that college. A summary of these data is presented in Table 5.

Table 5

Sample Characteristics, Faculty Replacement Needs Model

	Full	Associate	Assistant	All Ranks
Number	1,310	1,024	1,207	3,541
% of all Faculty	37.0%	28.9%	34.1%	
Median Age in Years	53.0	44.0	37.0	45.0
Mean Age in Years	53.7	45.2	37.5	45.7
Standard Deviation	7.2	7.3	6.7	
Median Appointment Year	1967	1977	1986	1976
% in: Sciences	27.5%	22.6%	18.6%	23.1%
Social Sciences	32.8%	33.7%	33.8%	33.4%
Humanities	35.5%	34.4%	39.3%	36.5%
Other Disciplines	4.2%	9.3%	8.3%	7.0%

The replacement needs model tracks faculty flow into and out of each rank in the following manner:

1. All faculty were projected to retire at age 65. This is consistent with the average retirement ages in the studies noted above, and given the lack of reliable evidence that early (or late)

retirement incentives will have a major influence on retirement age in the future, seemed a reasonable assumption.

2. The proportions of full, associate, and assistant professors were not explicitly adjusted (i.e., they were not forced to remain at FY89 levels), and new faculty were placed at the assistant professor level. In reality, hiring at the associate and full professor level is not uncommon; however, in the absence of data from colleges in the sample to specify the extent of such hiring, it seemed reasonable for the model to assume that new faculty would be assistant professors.

3. Instructors were included with assistant professors. Part-time or adjunct faculty data were never collected. Other faculty categories (e.g., lecturer) were excluded from the model. The latter condition resulted in the exclusion of only 10 faculty out of a total pool of 3,551 (0.3%).

4. Faculty attrition was computed for each rank separately (see Table 6). Total loss from rank was the sum of retirement loss (the number reaching age 65 that year, minus the fraction who would have left that rank for other reasons before reaching retirement age) and other losses (the total non-retirement attrition ratio times total number in that rank). Replacements for the full and associate ranks were the number of faculty at the next lower rank times that rank's promotion ratio. For the assistant rank, replacements were new hires (computed as the total expected size of the entire faculty minus the net loss by attrition for all ranks). Total expected faculty size was projected to increase at a rate of 0.5% annually for the colleges and time period under consideration, based on the median growth rate of colleges submitting attrition data.

The number of retirees, net loss of faculty, needed new hires (loss replacements plus growth), and total faculty size were calculated for all ranks combined and each year from 1989 - 2005. Annual summary ratios were also derived, and included the number of retirees as a percentage of net loss and of all faculty, net loss and needed new hires as a percentage of all faculty, the proportion of full, associate, and assistant professors on the faculty, and an exploratory estimate of the number of faculty who leave voluntarily for non-retirement reasons and recycle back into the professorial labor pool. For full professors this was estimated as 30% of voluntary non-retiring resignees, and for associate and assistant professors, 50% and 70% respectively. These latter ratios are not based on actual data, but on the assumption that junior faculty in this category are more likely to remain in the academic labor pool than their more senior colleagues. These hypothetical "recycled" faculty were not formally included in the replacement needs model itself, i.e., total need was not decremented by faculty recycles.

All of these data were tabulated for the collective faculty as a whole (Table 7), and for departments in the Social Sciences(Table 8), Humanities (Table 9), and Sciences (Table 10) separately. The placement of departments into one of these three groups or into an Other category is described in Appendix A. Finally, Charts A - H illustrate graphically the trends outlined in Tables 7 - 10.

{Insert Tables 6 -10 and Charts A - H Here}

Discussion

The data presented above offer preliminary evidence that the next 15 years will witness a steep increase in the annual net loss of college faculty, the replacement of whom may be exacerbated by growth in the overall size of the professoriate. Regardless of which measure of loss or need is plotted over time, the number of needed replacement faculty is projected to increase gradually during this time period with peaks of relatively acute need in the years 1996, 2000, and 2003 (see Chart A). The annual replacement need in the year 2003 is projected to be 37% higher than it was in 1989.

The distributions of current age, retirement year, total retirees, total net loss, total new hires, and the summary ratios are similar to one another because retirees account for most of the year-to-year variability in these measures (see Chart B) though only 17% - 37% of total net faculty loss. Furthermore, these distributions are characterized by rather dramatic one- and two-year fluctuations in either direction. This lack of smoothness may be a function of the size or nature of the sample used in this study, of the assumption that all retirements will occur at age 65, or of actual hiring, mobility, and attrition patterns in the national population.

Faculty aging, retirement, and attrition appear to have a differential impact on various academic departments (see Chart C). The Humanities will typically have the greatest replacement need (new hires as a percentage of all faculty) from 1989 to 2000. However, the Sciences tend to have the greatest need in the early years of the next century and the steepest overall increase in replacements. In terms of the linear trends of the projected distributions (Chart D), the Sciences intersect the Social Sciences in 1996 and the Humanities in 2000. It is of interest that these years also represent peaks in the overall replacement needs distribution. Finally, compared to the 37% increase in overall annual faculty replacement need between 1989 and 2003, the respective increases for the Humanities, Social Sciences, and Sciences are 27%, 47%, and 49%.

Chart E presents the distribution of the years in which faculty in the sample were initially hired in their present positions. Given that retirees account for most of the year-to-year variability in net faculty loss, the reason for replacement need peaks in 1996 and 2000 becomes clear: there was a major upsurge in faculty hiring from 1963 through 1968. These years witnessed not only significant growth among established college faculties in this country, but also the birth of many new colleges and proprietary institutions requiring start-up faculties. It remains unclear why the hiring , at least from 1956 through 1968, is relatively smoother than the retirement trend, and why there isn't an earlier hiring peak corresponding to the retirement peak in the year 2003. One possible explanation is that a

period of retrenchment in the early 1970's, and the resultant loss of many faculty who had been hired the previous decade, disrupted the normal hire-to-retire cohort flow.

The hypothesis that an increase in faculty replacement needs will coincide with increases in student enrollments linked to the anticipated upswing in high school graduates in the 1990's was also tested with this model. The projected number of high school graduates in this country for the next 15 years was obtained from the 1988 WICHE study (see Chart F), and indicate that the first significant recovery from the early-1990's enrollment slump will begin in the Fall of 1995 and continue into the next century. The stanines (standard scores with a mean of 5 and standard deviation of 2) of both these enrollment data and the faculty replacement needs findings are plotted in Charts G and H. Both the stanine distributions and their linear trends suggest a close parallel between the increases in projected college enrollments and needed faculty. In other words, the faculty replacement needs projected in this study may not be attenuated by student enrollment declines; on the contrary, probable needs in the late 1990's and beyond may be even greater than those projected above if the quality of instruction and research at American colleges and universities is to be maintained or enhanced.

Supply Considerations

This study has attempted to project demand for new faculty over the next 15 years. The significance of any projected demand increases becomes clearer within the context of available faculty supply estimates for the same time period. While relatively little data exist that shed light on this phenomenon, most studies (Office of Technology Assessment, 1985; American Institute of Physics, 1973; McPherson, 1985; National Science Foundation, 1987) concur that the late 1990's and early years of the next century will witness reductions in faculty supply : demand ratios. For example, the National Center for Education Statistics (1988) projects a 2.97% increase in Ph.D. production between FY90 and FY98. By comparison, the present model projects a 16.25% increase in needed faculty for the same time period. A slightly more optimistic supply projection can be obtained from the same source by examining baccalaureate production nine years prior to needed Ph.D. supply. The number of bachelor's degrees awarded in the U.S. is projected to increase by 5.76% between FY80 and FY88 (suggesting the possibility of a parallel increase in Ph.D.'s between FY89 and FY97). The unfortunate implication of the latter projection method is that baccalaureate production is expected to peak in FY89 and then decline throughout the 1990's.

In all of these scenarios, the demand for faculty projected by the present model significantly outpaces the supply of new Ph.D.'s. Other sources of new faculty include those leaving other institutions (hypothesized conservatively here to supply 16% to 21% of faculty need); those currently

employed in government, business, and industry; and those who received their Ph.D.'s in the 1970's and 1980's but subsequently failed to secure tenure-track appointments and are now unemployed or working as itinerant full-time faculty, adjunct faculty, or educators in the primary and secondary sector.

One set of strategies to cope with probable supply : demand reductions involves minimizing demand by curtailing faculty attrition and growth. The degree to which faculty attrition can be controlled through policy initiatives, and the cost of such initiatives, remain unclear. An institution could conceivably lose competitive ground with such efforts, especially if relatively weak faculty were retained or if related costs deflected too many resources from programmatic or physical plant improvements. Another set of strategies involves increasing the supply of new Ph.D.'s through vigorous efforts at the national level to promote post-baccalaureate enrollment in graduate programs. Isolated institutional efforts in this area will probably have a negligible impact on the national supply. A final passive alternative is for institutions to accept the reality of fewer quality applications and then either to take longer to fill open positions (e.g., via multiple searches), or to hire faculty from non-traditional sources and risk needing to replace them more often (further inflating the attrition rate) or devote professional development resources to improving their performance and retention. The latter options would seem to have the lowest chance of producing, in an efficient manner, a thoroughly competent national faculty to lead U.S. higher education into the next century.

Conclusions

Several questions remain about the the validity and generalizability of the model presented in this paper. Of special importance are the representativeness of the sample and the accuracy of the attrition ratios collected from participating colleges.

It is unclear whether the present sample is representative of the American professoriate. Available data suggest few differences between the model's sample and either the larger group of 60 similar institutions in the summary table above, or the even larger university sample in Lozier and Dooris (1987). The data on appointment year are also consistent with national historical trends. While more research is needed to validate these projections, it seems reasonable to view the present findings as valid but preliminary until their limits have been empirically tested. It should also be noted that the model is intended to examine aggregate trends, not to provide individual institutions with accurate projections of their own faculty replacement needs in the years ahead.

Certainly there is measurement error in the attrition estimates supplied by the sample of participating colleges, though perhaps not more than in other projection models. Whenever

alternative ratios were available, the smaller one was used in the model to produce relatively conservative estimates of faculty loss. Accordingly, all projections should be interpreted as points within a confidence interval rather than absolute values.

It is interesting to note that the attrition and growth ratios used above appear to be higher than those reported by Bowen & Schuster (1986). Their attrition ratios for faculty leaving academe, an admittedly conservative 4 - 6%, are in fact only slightly lower than the 6-8% figures in the present study (which include faculty who leave an institution but remain within academe). The 0.5% annual growth estimate in the present study also appears to increase the size of the faculty at a higher rate than the Bowen and Schuster projections. In reality, 3 of their model's 7 scenarios predict positive growth in the total size of the national professoriate, ranging from 5.5% to 9.5% (average = 8.1%) over a 15 year period corresponding to that in the present study (where a total growth in the professoriate of 7.8% was projected over 15 years). Beyond these general trends, the assumptions underlying their model diverge so markedly from those in the present study that direct comparisons of projections are unwarranted.

In summary, the trends in faculty attrition and replacement needs outlined in this study will require continued scrutiny in the years ahead. The demand for new faculty may become especially acute if true replacement needs exceed these projections, and if faculty supply is suppressed by the decreased interest in academic careers among undergraduates and by other factors noted above. Enhancing the status of the profession could reduce faculty attrition and motivate current students to pursue doctoral study and eventually enter the professoriate; otherwise, competition among institutions for highly qualified scholars can be expected to intensify. Severe faculty shortages in the Sciences appear most likely in the early years of the next century unless attrition is curtailed or supply is enhanced.

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Appendix A

Departmental Clustering

Humanities
Philosophy
Religion/Theology
Art
Modern Languages
Classics
English
Speech/Communication Arts
Drama/Theatre
Literature
Journalism
Music

Sciences
Mathematics
Computer Science
Astronomy
Biology
Physics
Geology
Environmental Science
Chemistry

Social Sciences
Anthropology
Sociology
Ethnic Studies
Government/Political Science
History
American Studies
Business
Economics
Geography
Psychology
Education
International Studies

Other
Nursing
Physical Education
Engineering

Table 6: Replacement Needs Model, All Departments

	Full Professors					Associates					Assistants				All Ranks		
Year (Fall)	Total	# Retiring	Other loss	Total loss	Promotions In	Total	# Retiring	Other loss	Total loss	Promotions In	Total	# Retiring	Other loss	Total loss	Net loss	New hires	Total Faculty
1989	1,310	34	20	55	82	1,024	2	107	109	120	1,209	2	260	262	224	241	3,543
1990	1,337	32	21	53	83	1,035	6	109	115	118	1,188	2	256	257	224	242	3,561
1991	1,367	33	21	55	83	1,038	6	109	115	117	1,173	1	253	253	223	241	3,579
1992	1,395	39	21	61	83	1,040	6	109	115	116	1,161	0	250	250	228	246	3,596
1993	1,417	48	22	70	83	1,040	6	109	115	115	1,157	3	249	252	239	258	3,614
1994	1,431	49	22	71	83	1,040	7	109	116	116	1,162	4	250	254	243	261	3,632
1995	1,442	50	22	72	83	1,039	11	109	120	116	1,169	2	252	253	246	264	3,651
1996	1,453	60	22	82	83	1,036	19	109	127	117	1,180	6	254	260	270	288	3,669
1997	1,453	61	22	83	82	1,026	11	108	118	120	1,208	3	260	263	263	281	3,687
1998	1,452	44	22	67	82	1,028	12	108	119	122	1,226	3	264	267	249	268	3,706
1999	1,467	48	23	71	82	1,030	14	108	122	122	1,227	3	264	267	256	275	3,724
2000	1,479	64	23	87	82	1,030	21	108	130	123	1,234	6	266	272	283	302	3,743
2001	1,474	59	23	82	82	1,023	18	107	125	126	1,264	4	272	276	276	294	3,762
2002	1,474	44	23	67	82	1,024	21	107	128	128	1,282	3	276	279	265	284	3,780
2003	1,489	75	23	98	82	1,023	29	107	136	128	1,287	11	277	288	312	331	3,799
2004	1,473	72	23	95	81	1,015	27	107	133	132	1,330	6	286	293	307	326	3,818
2005	1,460	59	22	82	81	1,014	31	106	138	136	1,363	5	294	299	302	321	3,837

Notes: An annual total faculty growth rate of 0.5% was used in this model.
Number retiring was decremented to remove those who leave faculty ranks for other reasons before reaching retirement age.
Retirees are listed at their 1989 rank, regardless of the rank they will eventually hold upon retirement.

Table 7: Replacement Needs Findings, All Departments

Year (Fall)	Total Retirees	Net loss	New hires	# Retiring as % of: Net loss	# Retiring as % of: All faculty	Loss as % of All faculty	New Hires as % of All faculty	Full Profs as % of Faculty	Associates as % of Faculty	Assistants as % of Faculty	Labor market recycles Voluntary transfers: # Available	Labor market recycles Voluntary transfers: % of New Hires
1989	38	224	241	16.9%	1.1%	6.3%	6.8%	37.0%	28.9%	34.1%	50	20.9%
1990	40	224	242	18.0%	1.1%	6.3%	6.8%	37.6%	29.1%	33.4%	50	20.6%
1991	41	223	241	18.1%	1.1%	6.2%	6.7%	38.2%	29.0%	32.8%	49	20.4%
1992	46	228	246	20.1%	1.3%	6.3%	6.8%	38.8%	28.9%	32.3%	49	19.9%
1993	58	239	258	24.1%	1.6%	6.6%	7.1%	39.2%	28.8%	32.0%	49	19.0%
1994	60	243	261	24.8%	1.7%	6.7%	7.2%	39.4%	28.6%	32.0%	49	18.8%
1995	63	246	264	25.4%	1.7%	6.7%	7.2%	39.5%	28.5%	32.0%	49	18.7%
1996	85	270	288	31.5%	2.3%	7.4%	7.9%	39.6%	28.2%	32.2%	50	17.2%
1997	75	263	281	28.5%	2.0%	7.1%	7.6%	39.4%	27.8%	32.8%	51	18.0%
1998	59	249	268	23.7%	1.6%	6.7%	7.2%	39.2%	27.7%	33.1%	51	19.1%
1999	66	256	275	25.7%	1.8%	6.9%	7.4%	39.4%	27.7%	32.9%	51	18.6%
2000	92	283	302	32.4%	2.5%	7.6%	8.1%	39.5%	27.5%	33.0%	51	17.1%
2001	81	276	294	29.4%	2.2%	7.3%	7.8%	39.2%	27.2%	33.6%	52	17.8%
2002	68	265	284	25.7%	1.8%	7.0%	7.5%	39.0%	27.1%	33.9%	53	18.7%
2003	114	312	331	36.7%	3.0%	8.2%	8.7%	39.2%	26.9%	33.9%	53	16.1%
2004	105	307	326	34.2%	2.8%	8.0%	8.5%	38.6%	26.6%	34.8%	55	16.7%
2005	96	302	321	31.8%	2.5%	7.9%	8.4%	38.0%	26.4%	35.5%	56	17.4%

Table 8: Replacement Needs Findings, Social Science Departments

Year (Fall)	Total Retirees	Net loss	New hires	# Retiring as % of: Net loss	# Retiring as % of: All faculty	Loss as % of All faculty	New Hires as % of All faculty	Full Profs as % of Faculty	Associates as % of Faculty	Assistants as % of Faculty	Labor market recycles Voluntary transfers: # Available	Labor market recycles Voluntary transfers: % of New Hires
1989	7	70	75	9.9%	0.6%	5.9%	6.4%	36.3%	29.1%	34.5%	17	22.5%
1990	16	78	84	21.1%	1.4%	6.6%	7.1%	37.3%	29.4%	33.3%	17	19.8%
1991	13	75	81	17.9%	1.1%	6.3%	6.8%	37.7%	29.2%	33.0%	17	20.5%
1992	12	73	79	16.1%	1.0%	6.1%	6.6%	38.4%	29.2%	32.4%	16	20.9%
1993	14	75	81	19.3%	1.2%	6.2%	6.7%	39.0%	29.1%	31.9%	16	20.1%
1994	16	77	83	21.2%	1.3%	6.3%	6.8%	39.5%	29.0%	31.5%	16	19.6%
1995	20	80	86	24.4%	1.6%	6.6%	7.1%	39.9%	28.9%	31.2%	16	18.8%
1996	27	88	94	30.8%	2.2%	7.2%	7.7%	39.9%	28.7%	31.4%	16	17.3%
1997	20	82	88	24.5%	1.6%	6.7%	7.2%	40.0%	28.0%	32.0%	17	18.8%
1998	16	79	85	20.9%	1.3%	6.3%	6.8%	40.1%	27.9%	32.0%	17	19.7%
1999	17	79	86	21.6%	1.4%	6.4%	6.9%	40.5%	27.8%	31.8%	17	19.5%
2000	31	94	100	33.6%	2.5%	7.5%	8.0%	40.8%	27.6%	31.6%	17	16.7%
2001	25	89	95	28.2%	2.0%	7.0%	7.5%	40.3%	27.2%	32.5%	17	18.0%
2002	28	93	99	30.5%	2.2%	7.3%	7.8%	40.2%	26.9%	32.9%	17	17.5%
2003	38	104	110	36.9%	3.0%	8.2%	8.7%	40.3%	26.3%	33.5%	18	16.0%
2004	34	101	107	33.8%	2.7%	7.9%	8.4%	39.6%	26.0%	34.4%	18	16.8%
2005	28	96	103	29.2%	2.2%	7.5%	8.0%	39.0%	25.9%	35.1%	18	17.9%

Table 9: Replacement Needs Findings, Humanities Departments

Year (Fall)	Total Retirees	Net loss	New hires	# Retiring as % of: Net loss	All faculty	Loss as % of All faculty	New Hires as % of All faculty	Full Profs as % of Faculty	Associates as % of Faculty	Assistants as % of Faculty	Labor market recycles Voluntary transfers: # Available	% of New Hires
1989	15	86	93	17.7%	1.2%	6.7%	7.2%	36.0%	27.2%	36.8%	19	20.9%
1990	14	84	91	17.0%	1.1%	6.5%	7.0%	36.4%	27.8%	35.7%	19	21.0%
1991	17	87	93	20.1%	1.3%	6.6%	7.1%	37.1%	28.1%	34.8%	19	20.2%
1992	20	89	96	22.9%	1.6%	6.8%	7.3%	37.5%	28.2%	34.3%	19	19.5%
1993	22	91	98	24.5%	1.7%	6.9%	7.4%	37.7%	28.3%	34.0%	19	19.1%
1994	30	99	105	30.0%	2.2%	7.4%	7.9%	37.6%	28.5%	33.9%	19	17.8%
1995	24	94	101	26.0%	1.8%	7.1%	7.6%	37.3%	28.5%	34.2%	19	18.7%
1996	32	102	108	31.0%	2.4%	7.6%	8.1%	37.6%	28.2%	34.1%	19	17.5%
1997	32	103	110	31.0%	2.4%	7.7%	8.2%	37.3%	28.1%	34.6%	19	17.5%
1998	26	98	105	26.8%	1.9%	7.3%	7.8%	36.7%	28.2%	35.1%	20	18.6%
1999	30	102	109	29.6%	2.2%	7.5%	8.0%	36.8%	28.3%	34.9%	20	17.9%
2000	32	105	112	30.6%	2.4%	7.7%	8.2%	36.9%	27.9%	35.2%	20	17.7%
2001	29	103	110	28.4%	2.1%	7.5%	8.0%	36.7%	27.9%	35.4%	20	18.2%
2002	20	94	101	21.1%	1.4%	6.8%	7.3%	36.7%	27.9%	35.4%	20	19.9%
2003	37	111	118	33.7%	2.7%	8.0%	8.5%	37.2%	28.0%	34.8%	20	16.9%
2004	32	106	113	29.7%	2.3%	7.6%	8.1%	37.0%	27.6%	35.4%	20	17.9%
2005	32	107	114	29.8%	2.3%	7.6%	8.1%	37.1%	27.4%	35.5%	20	17.9%

Table 10: Replacement Needs Findings, Science Departments

Year (Fall)	Total Retirees	Net loss	New hires	# Retiring as % of: Net loss	# Retiring as % of: All faculty	Loss as % of All faculty	New Hires as % of All faculty	Full Profs as % of Faculty	Associates as % of Faculty	Assistants as % of Faculty	Labor market recycles Voluntary transfers: # Available	Labor market recycles Voluntary transfers: % of New Hires
1989	12	49	53	24.0%	1.4%	6.0%	6.5%	44.1%	28.4%	27.5%	10	18.5%
1990	7	45	49	15.2%	0.8%	5.4%	5.9%	44.0%	28.0%	28.0%	10	20.5%
1991	7	45	49	15.4%	0.8%	5.4%	5.9%	44.6%	27.6%	27.8%	10	20.4%
1992	11	49	53	21.9%	1.3%	5.9%	6.4%	45.1%	27.3%	27.6%	10	18.9%
1993	14	52	56	26.2%	1.6%	6.2%	6.7%	45.3%	26.9%	27.9%	10	17.9%
1994	11	50	54	21.6%	1.3%	5.9%	6.4%	45.1%	26.5%	28.5%	10	19.0%
1995	13	52	56	24.6%	1.5%	6.2%	6.7%	45.1%	26.3%	28.6%	10	18.4%
1996	22	62	66	35.6%	2.6%	7.3%	7.8%	44.8%	26.3%	29.0%	10	15.9%
1997	17	58	62	28.8%	2.0%	6.8%	7.3%	44.0%	25.7%	30.3%	11	17.6%
1998	13	54	59	23.2%	1.5%	6.4%	6.9%	43.3%	25.8%	30.9%	11	18.9%
1999	14	56	60	24.6%	1.6%	6.5%	7.0%	43.2%	25.8%	31.0%	11	18.6%
2000	22	64	69	34.1%	2.5%	7.5%	8.0%	42.9%	26.0%	31.1%	11	16.4%
2001	22	66	70	33.8%	2.6%	7.6%	8.1%	42.4%	25.4%	32.2%	12	16.6%
2002	15	60	64	25.7%	1.8%	6.9%	7.4%	41.3%	25.6%	33.1%	12	18.6%
2003	30	75	79	39.9%	3.4%	8.5%	9.0%	41.1%	25.7%	33.2%	12	15.2%
2004	32	78	83	40.5%	3.6%	8.9%	9.4%	39.6%	25.5%	34.8%	13	15.2%
2005	30	78	82	38.0%	3.3%	8.8%	9.3%	38.1%	25.5%	36.4%	13	15.9%

Chart A

Total Faculty Replacement Needs

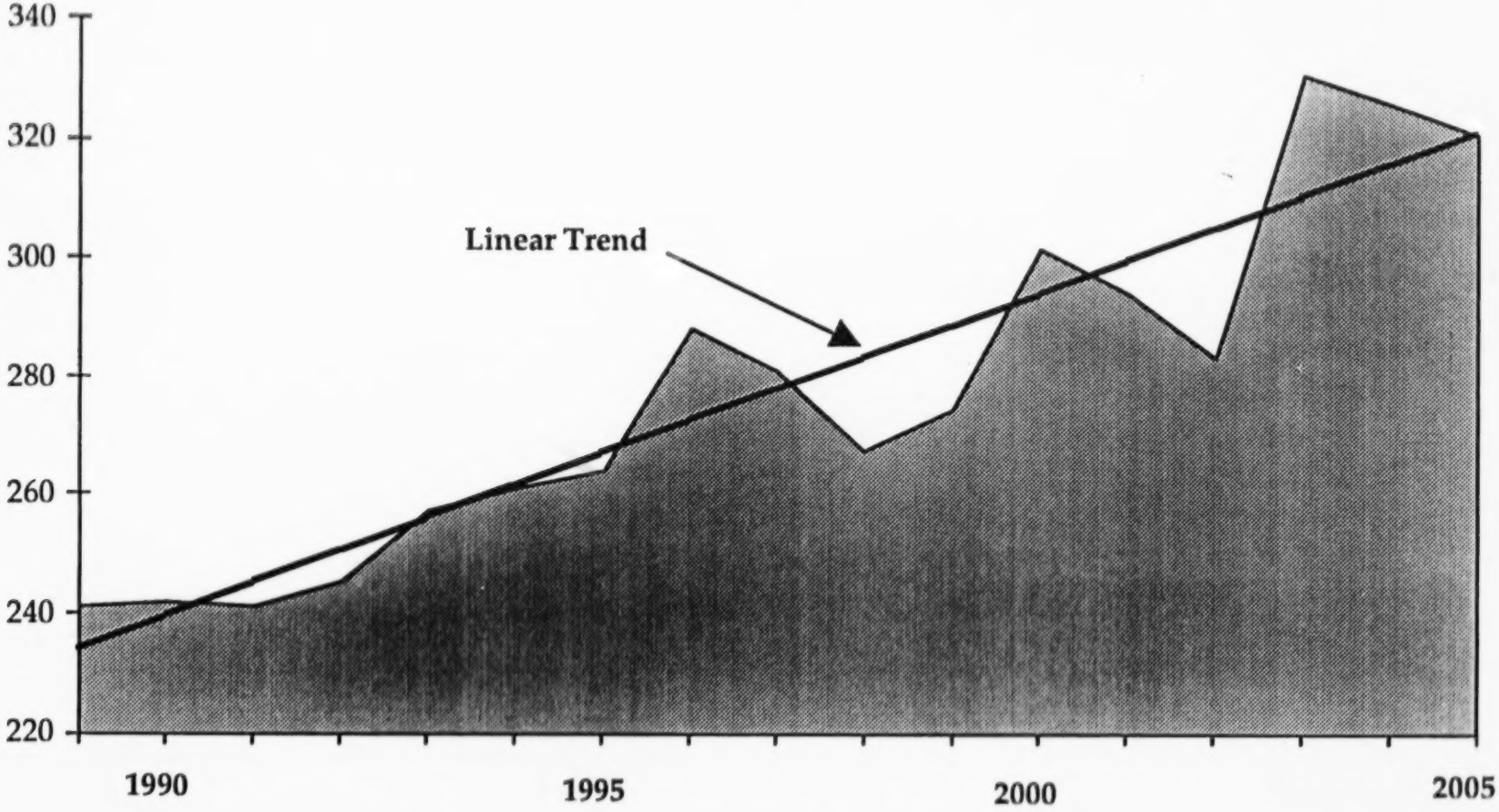


Chart B

Projected Annual Faculty Retirements, 29 Colleges

Chart C

New Hires as % of All Faculty
9.5%
9.0%
8.5%
8.0%
7.5%
7.0%
6.5%
6.0%
5.5%
1990
1995
2000
2005
SS
Hum
Sci

Linear Trends, New Hires as % of All Faculty

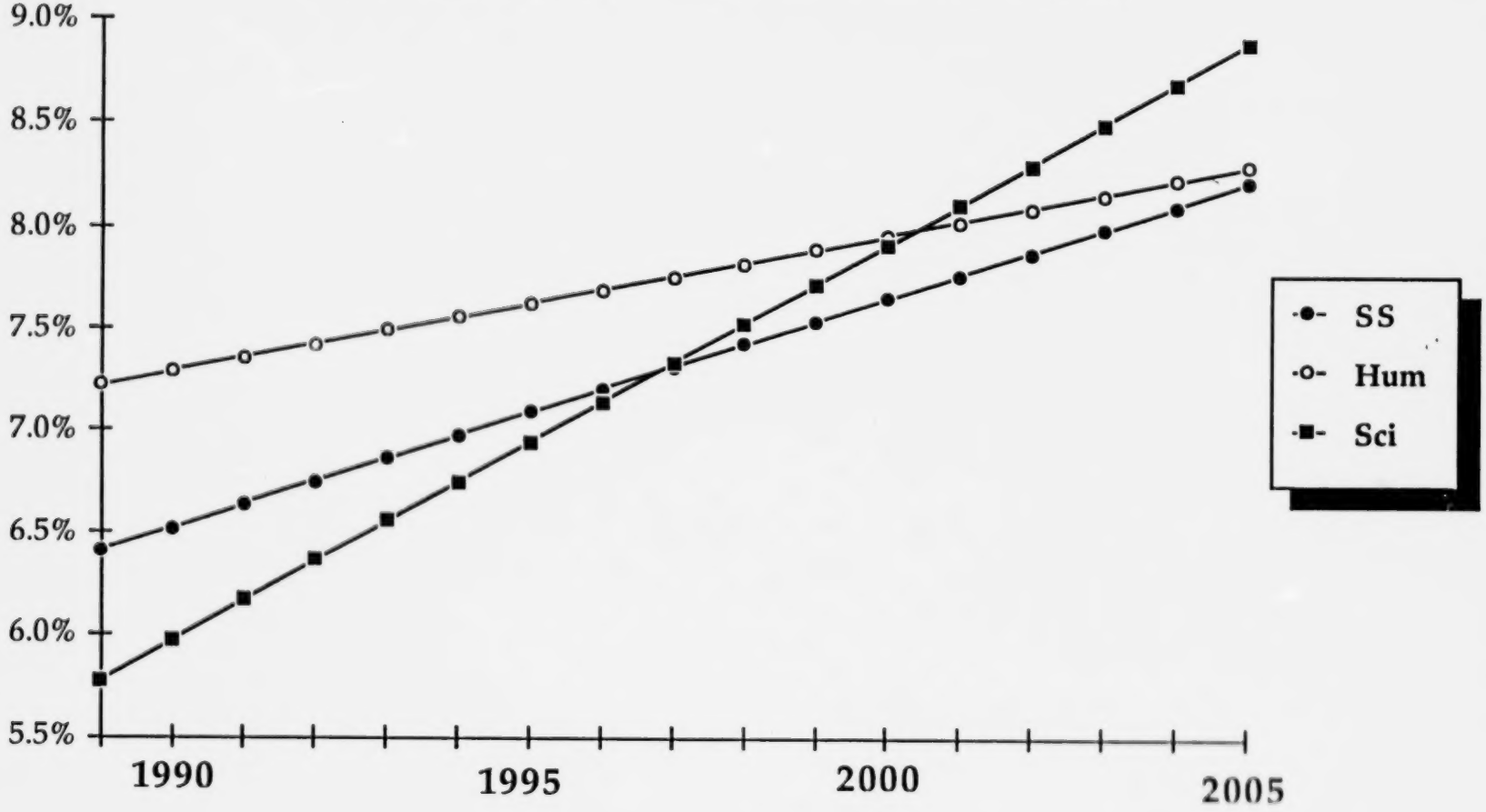


Chart E

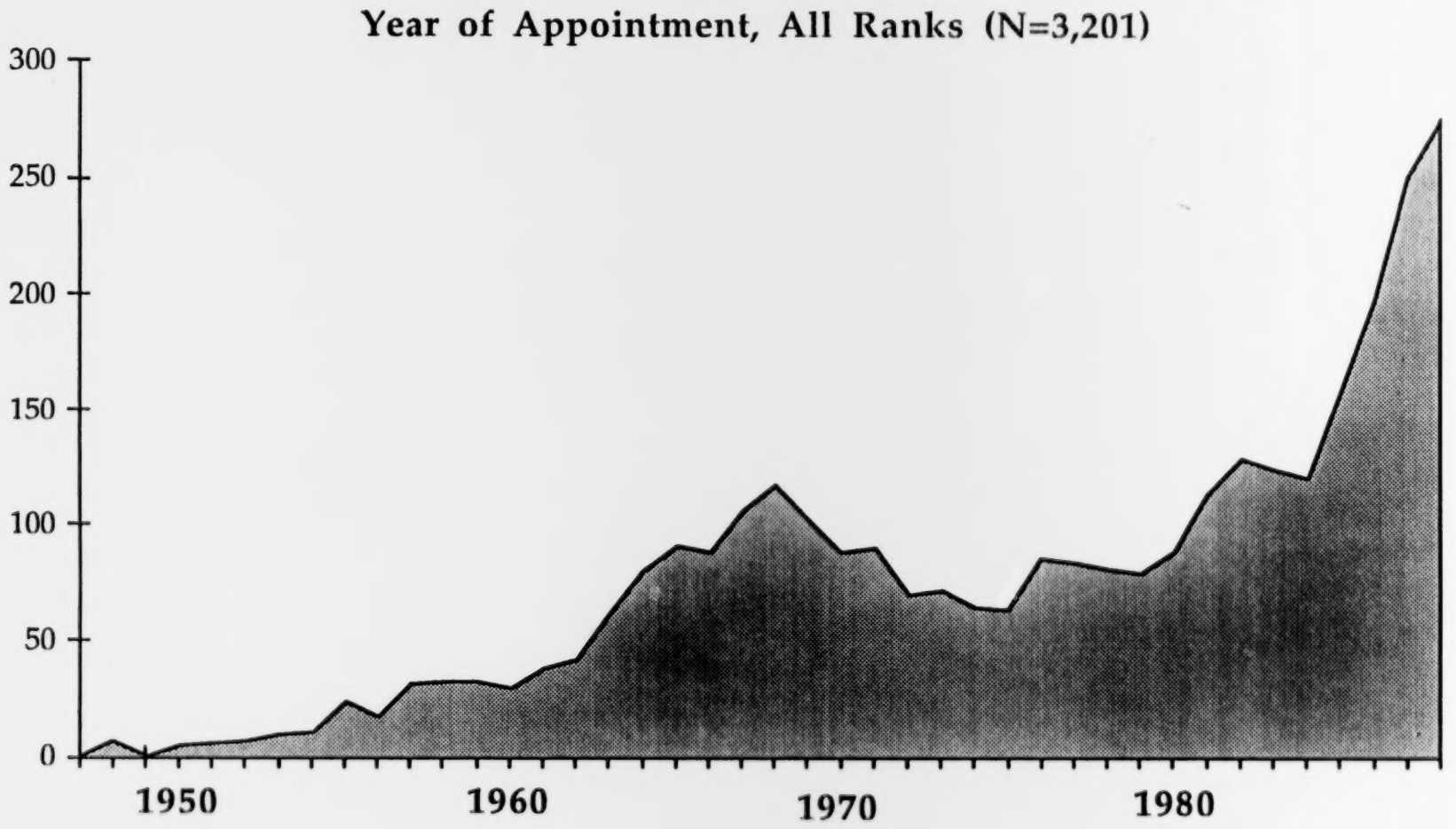
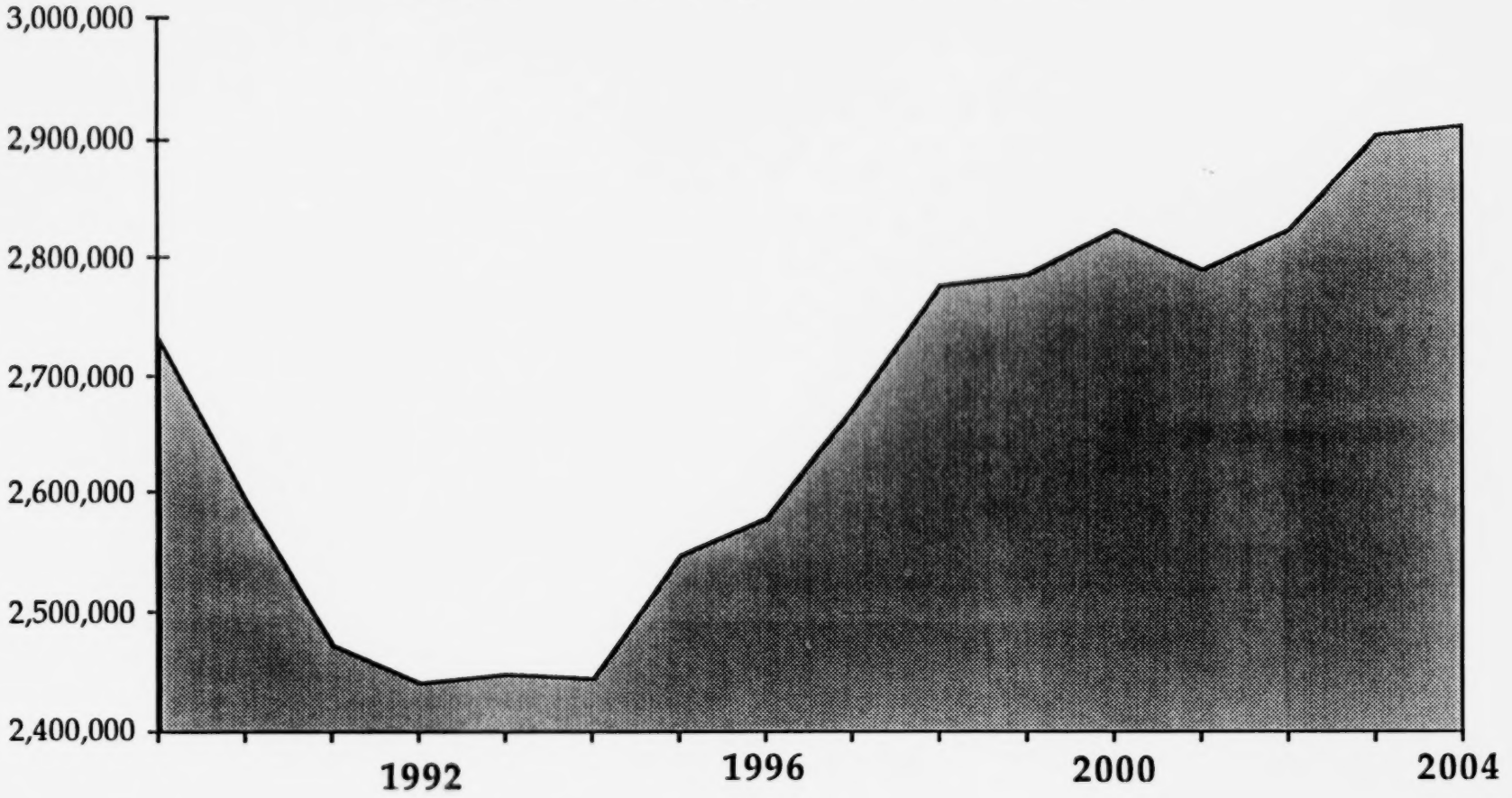
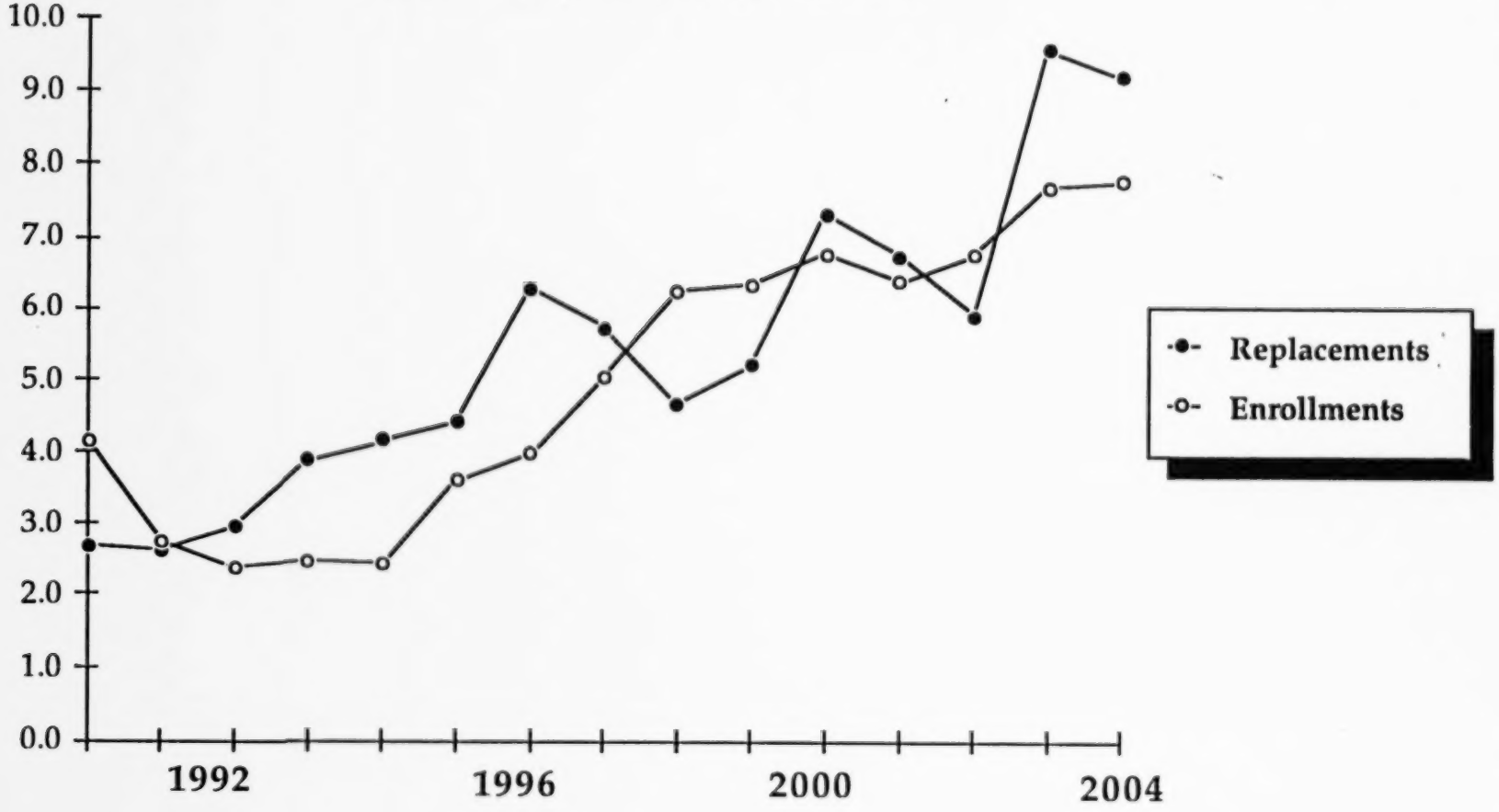

Year of Appointment, All Ranks (N=3,201)
300
250
200
150
100
50
0
1950
1960
1970
1980

Chart F

Projected U.S. High School Graduates



Student Enrollment and Faculty Replacement Need Projections (Stanines)



Student Enrollment and Faculty Replacement Need Projections (Linear Trend of Stanines)